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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/868,716 | 06/20/2001 | Jurgen Beyerer | 34691/234885 | 3478 |

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EXAMINER

YAM, STEPHEN K

ART UNIT

PAPER NUMBER

2878

DATE MAILED: 07/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|-------------------------|--------------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/868,716 | BEYERER ET AL. <i>HL</i> |
| | Examiner Stephen Yam | Art Unit 2878 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 30-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 30-44 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 20 June 2001 is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4,5,6.
- 4) Interview Summary (PTO-413) Paper No(s). _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 35-42 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 35 recites the limitation "the recorded image" which lacks antecedent basis.

Claims 36-42 are indefinite by virtue of their dependency on an indefinite claim.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999

(AIPA) do not apply to the examination of this application as the application being examined

was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

2. Claims 30-34 and 43-44 are rejected under 35 U.S.C. 102(b) as being unpatentable by Smeyers et al. US Patent No. 5,440,391.

Regarding Claims 30 and 43, Smeyers et al. teach a device for detecting defects on a workpiece comprising illuminating the workpiece by at least two light sources (2, 4, 6, 8) from different directions, recording by means of a camera (11) the illuminated workpiece and the shadows resulting from the illumination (see Col. 1, lines 61-63), and processing the recorded data in a computer (12).

Regarding Claim 31, Smeyers et al. teach the camera arranged at a fixed location (see Fig. 1).

Regarding Claim 32, Smeyers et al. teach the camera including a lens (10) and wherein the camera is encased in at least the region of the lens.

Regarding Claim 33 and 44, Smeyers et al. teach a processing step including exchanging signals between the computer and a stored program control (see Col. 3, lines 25-28).

Regarding Claim 34, Smeyers et al. teach the recorded data comprising an image (see Col. 3, line 15) and a further step of performing a qualitative or quantitative image evaluation on the recorded image (Col. 3, lines 22-24).

3. Claims 30-35, 37-40, and 42-44 are rejected under 35 U.S.C. 102(e) as being unpatentable by Roy et al. US Patent no. 5,956,134.

Regarding Claim 30 and 43, Roy et al. teach a device for detecting defects comprising two light sources (79) (see Fig. 2) from different directions, recording by means of a camera (60) the illuminated workpiece, and processing the recorded data in a computer (90) (see Col. 7, lines 16-18). Although Roy et al. do not specifically mention the recording of the shadows resulting from the illumination, it is inherent that shadows are produced due to the light sources and the inclination of the bumps, and that the shadows are captured in the recording of images.

Regarding Claim 31, Roy et al. teach the camera (60) arranged at a fixed location, mounted on a frame (52).

Regarding Claim 32, Roy et al. teach the camera (60) including a lens (64) wherein the camera is encased in at least a portion of the lens (see Fig. 3).

Regarding Claims 33 and 44, Roy et al. teach a processing step of exchanging signals between the computer and a stored program control (see Col. 7, lines 3-7).

Regarding Claim 34, Roy et al. teach the recorded data comprising an image (see Col. 7, lines 31-32) and a further step of performing a qualitative or quantitative image evaluation on the recorded image (see Col 7, lines 31-37).

Regarding Claim 35, Roy et al. teach the processing step including processing the recorded image by comparing the recorded image with a record of reference data (see Col 7, lines 31-37).

Regarding Claim 37, Roy et al. teach the recording and processing of a first image (see Col. 15, lines 12-14) and a second image (see Col. 15, lines 14-18)

Regarding Claim 38, Roy et al. teach the image processing step including a position correction (see Col. 7, lines 3-7).

Regarding Claims 39 and 40, Roy et al. teach the position correction including recording reference marks (see Fig. 6a, 6b, 7a, 7b, and Col. 8, lines 25-29), where the reference marks are lines (Fig. 7a and 7b) and/or dots (Fig. 6a and 6b) on a base.

Regarding Claim 42, Roy et al. teaches the image processing step comprising a defect detection (see Col. 6, lines 2-13 and Col. 7, lines 35-37).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roy et al. Roy et al. teach a method of detecting defects on workpieces comprising the steps of illuminating the workpiece by at least two light sources from different directions, recording the workpiece and shadows from the illumination, and processing the recorded data in a computer by comparing the recorded image with a reference image. Roy et al. do not teach the comparing step including a coarse correlation with the recorded data. It would have been obvious to one of ordinary skill in the art at the time the invention was made to perform a coarse correlation

between the recorded image and the reference image, to quickly determine the alignment requirements and verify the positions of the leads without a complex, time-consuming analysis.

6. Claim 40 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roy et al. in view of Cochran et al. US Patent No. 4,882,498.

Roy et al. teach a method of detecting defects on workpieces comprising the steps of illuminating the workpiece by at least two light sources from different directions, recording the workpiece and shadows from the illumination, and processing the recorded data in a computer by comparing the recorded image with a reference image. Roy et al. do not teach the processing step comprising a brightness adjustment for adapting the gray-scale values of the image.

Cochran et al. teach an inspection system with a brightness adjustment for adapting the grayscale values of the image (see Col. 7, lines 22-25). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the brightness adjustment of Cochran et al. to the inspection system of Roy et al., to facilitate viewing of non-uniform or sloping surfaces and provide compensation for light failure.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Reiser, US Patent No. 5,064,291, teaches a solder-joint inspection system with multiple light sources utilizing shape determination from shading.\

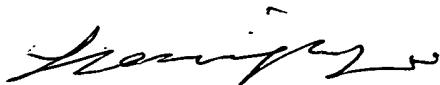
Yoshida et al., US Patent No. 5,963,328, teach a surface inspecting apparatus with a plurality of light sources and cameras to detect reflected light.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Yam whose telephone number is (703)306-3441. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on (703)308-4881. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7724 for regular communications and (703)308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

SY
June 28, 2002


Kevin Pyo
Primary Examiner